УДК 519.876.2

I.V. Tereshchuk
Donetsk National Technical University
The Department of Applied Mathematics and Informatics

FORMALIZATION OF THE BUDGETARY STRUCTURE OF THE ENTERPRISE IN THE PLANNING SYSTEM

Abstract

Tereshchuk I.V. Formalization of the budgetary structure of the enterprise in the planning system. In this paper is examined the budgetary structure of the enterprise. It consists of three levels: the first level is the final budgets, the second level - functional budgets, the third level - operating budgets. Formalization of budgets in the system of the current planning is presented.

Keywords: budgetary structure, formalization, planning system.

Problem description. Today Ukrainian enterprises work in the conditions of unstable economic situation. In connection with this increases the importance and urgency of the decision of tasks of the current planning and budget control.

Literary Analysis. Results of research carried out in the direction of increasing the effectiveness of budget planning, stated in the work [1]. In the work [2] the basics of the mathematical logic and theory of sets are described, the use of which allows to formalize the budget structure.

The purpose of this article is to formalize the budgetary structure of enterprise in the system of current planning, that will allow to construct the mathematical model of forecasting the activity of enterprise.

The achieved results. For realization of this task it is necessary: to define the levels of budgetary structure, to consider tasks of planning at various levels, to implement the formalization of the budgets of various levels, explore their relationship.

The research budget of the structure of the enterprise allows to distinguish three levels of budgets on functional grounds:

– the first level is the operational budgets (budgets of Financial Responsibility Centers (CFR));

– the second level - functional budgets;

– the third level - final budgets (master-budget).

Formalization of the budgetary structure of the enterprise lies in the basis of development of the budget control system. The latter includes the following subsystems of the control system: current planning, plan-fact analysis, operational control.

The current planning is often viewed as top-down process, the operative control and the plan-fact analysis as bottom-to-top processes. The task of planning

of activity of the enterprise implies the drawing up of the final, functional and operating budgets for the planning period is a month.

In accordance with the budget structure planning at the enterprise can be considered as a three-level control system. The functional elements of the planning system are budgets.

On the first level are made three final budgets: Budgeted Income Statement, Cash Budget, Budgeted Balance Sheet.

The set of final budgets can be defined as:

$$Ib = Ib_1 \bigcup Ib_2 \bigcup Ib_3, \tag{1}$$

where Ib - set of final budgets, Ib_1 - Budgeted Income Statement, Ib_2 - Cash Budget, Ib_3 - Budgeted Balance Sheet.

The indicators of final budgets can be written as follows:

$$Y(Ib) = \{VD, VR, PR, Sl, Ab, Pb\}, \tag{2}$$

where VD - gross profit, VR - gross expense, PR - net income, Sl - balance, Ab - asset balance, Pb - debit balance.

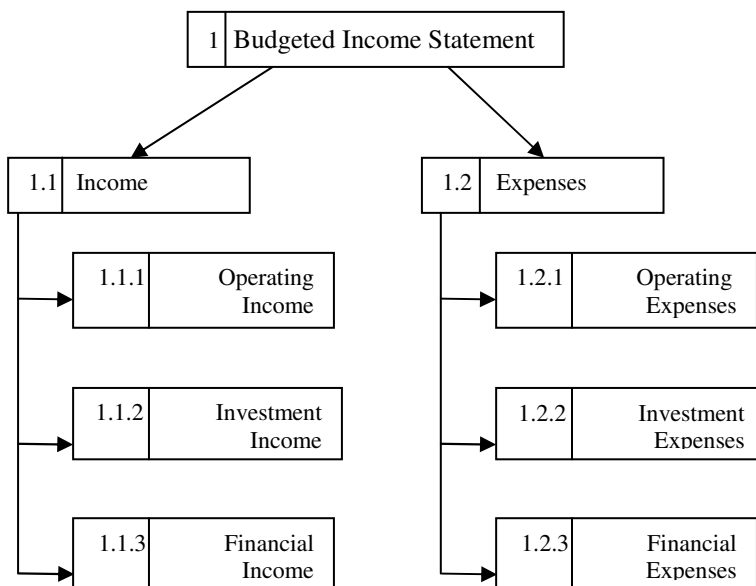The structure of Budgeted Income Statement is presented in Fig.1.

Figure 1 – The Structure of Budgeted Income Statement
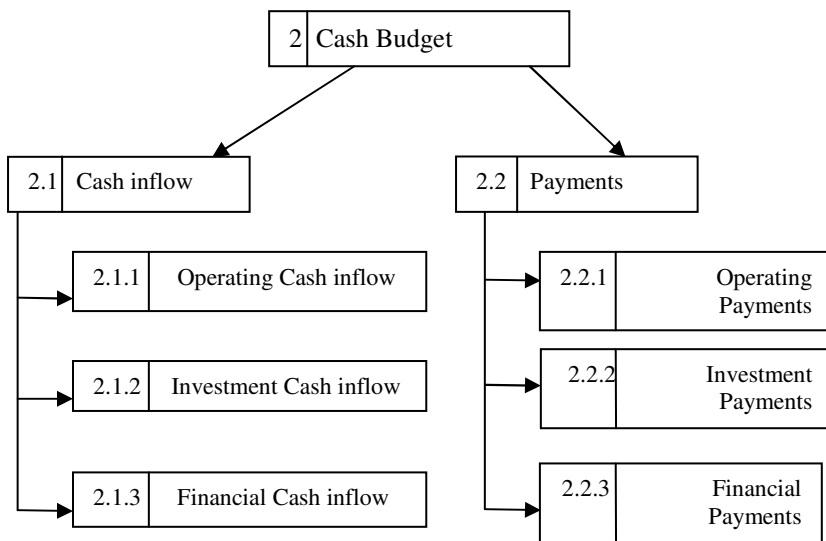
The structure of the Cash Budget is shown in Fig. 2.

Figure 2 – The Structure of Cash Budget

Grouping and formalization of sets of functional budgets is carried out in accordance with the structure of activity of the enterprise.

The set of functional budgets has the form:

$$Fb = fd \bigcup fr \bigcup fp \bigcup fv \bigcup fz, \tag{3}$$

where Fb - set of functional budgets, fd, fr, fp, fv, fz - set of functional budgets of income, expenses, cash inflow, payments, materials respectively.

The indicators of functional budgets can be written as follows:

$$Y(Fb) = \left\{ D_k, R_k, P_k, V_k, Sz, k = \overline{1,3} \right\} \tag{4}$$

where D_k, R_k, P_k, V_k - income, expenses, cash inflow, payments for the k-th kind of activity (operating activity, investment, financial), Sz - cost of inventories at the end of the budget period.

Functional budgets are operating budgets, grouped by functional grounds.

$$fd = \bigcup_{s=1}^{S} od_s,$$

$$fr = \bigcup_{w=1}^{W} or_w,$$

$$fp = \bigcup_{s=1}^{S} op_s,$$

$$fv = \bigcup_{w=1}^{W} ov_w,$$ (5)

$$fz = \bigcup_{w=1}^{W} oz_w,$$

The set of operating budgets has form:

$$Ob = od \bigcup or \bigcup op \bigcup ov \bigcup oz,$$ (6)

where Ob - set of operating budgets, od, or, op, ov, oz - set of operating budgets of income, expenses, cash inflow, payments, materials respectively.

The indicators of operating budgets can be written as follows:

$$Y(Ob) = \left\{ D_{k,s}, P_{k,s}, R_{k,w}, V_{k,w}, Sz_w, k = \overline{1,3}, s = \overline{1,S}, w = \overline{1,W} \right\}$$ (7)

where $D_{k,s}, P_{k,s}$ - income, cash inflow for the k-th kind of activity of s-th CFR, $R_{k,w}, V_{k,w}, Sz_w$ - expenses, payments for the k-th kind of activity, cost of inventories of w-th CFR, S - the number of centres income, W - the number of centres expenses .

We can see then, that budgets of various levels are subject to the rule:

$$Ob \subset Fb \subset Ib,$$ (8)

where Ob - set of operating budgets, Fb - set of functional budgets, Ib - set of final budgets.

Classification and formalization of the variables of the system is an integral part of the development of mathematical models of the process of budgeting.

Conclusions. Scientific novelty of this work is to formalize the budgetary structure. The practical value is to connections between types of budgets. That will allow to construct the mathematical model of forecasting of enterprise activity.

References

1.   Callahan K.R. Project Management Accounting: Budgeting, Tracking, and Reporting Costs and Profitability / Callahan K.R., Stetz G.S., Brooks L.M. – Wiley, 2011. – 226 p.

2.   Graham R.L. Concrete Mathematics: A Foundation for Computer Science Addison / Graham R.L., Knuth D.E., Patashnik O. – Wesley Professional, 1994. – 672 p.